strategic financial management

Ca final (Institute of Chartered Accountants of India)

3
Leasing Decisions

Question 1

What are the characteristic features of Financial and Operating Lease?

Answer

Salient features of Financial Lease

(i) It is an intermediate term to long-term arrangement.

(ii) During the primary lease period, the lease cannot be cancelled.

(iii) The lease is more or less fully amortized during the primary lease period.

(iv) The costs of maintenance, taxes, insurance etc., are to be incurred by the lessee unless the contract provides otherwise.

(v) The lessee is required to take the risk of obsolescence.

(vi) The lessor is only the Financier and is not interested in the asset.

Salient features of Operating Lease

(i) The lease term is significantly less than the economic life of the equipment.

(ii) It can be cancelled by the lessee prior to its expiration date.

(iii) The lease rental is generally not sufficient to fully amortize the cost of the asset.

(iv) The cost of maintenance, taxes, insurance are the responsibility of the lessor.

(v) The lessee is protected against the risk of obsolescence.

(vi) The lessor has the option to recover the cost of the asset from another party on cancellation of the lease by leasing out the asset.

Question 2

Write a short note on Cross border leasing.

Answer

Cross-border leasing is a leasing agreement where lessor and lessee are situated in different countries. This raises significant additional issues relating to tax avoidance and tax shelters. It has been widely used in some European countries, to arbitrage the difference in the tax laws of different countries.

Cross-border leasing have been in practice as a means of financing infrastructure development in emerging nations. Cross-border leasing may have significant applications in financing infrastructure development in emerging nations - such as rail and air transport equipment, telephone and telecommunications, equipment, and assets incorporated into power generation and distribution systems and other projects that have predictable revenue streams.

A major objective of cross-border leases is to reduce the overall cost of financing through utilization by the lessor of tax depreciation allowances to reduce its taxable income, The tax savings are passed through to the lessee as a lower cost of finance. The basic prerequisites are relatively high tax rates in the lessor's country, liberal depreciation rules and either very flexible or very formalistic rules governing tax ownership.

Question 3

Many companies calculate the internal rate of return of the incremental after-tax cash-flows from financial leases.

What problems do you think this may give rise to? To what rate should the internal rate of return be compared? Discuss.

Answer

Main problems faced in using Internal Rate of Return can be enumerated as under:

(1) The IRR method cannot be used to choose between alternative lease bases with different lives or payment patterns.

(2) If the firms do not pay tax or pay at constant rate, then IRR should be calculated from the lease cash-flows and compared to after-tax rate of interest. However, if the firm is in a temporary non-tax paying status, its cost of capital changes over time, and there is no simple standard of comparison.

(3) Another problem is that risk is not constant. For the lessee, the payments are fairly riskless and interest rate should reflect this. The salvage value for the asset, however, is probably much riskier. As such two discount rates are needed. IRR gives only one rate, and thus, each cash-flow is not implicitly discounted to reflect its risk.

(4) Multiple roots rarely occur in capital budgeting since the expected cashflow usually changes signs once. With leasing, this is not the case often. A lessee will have an immediate cash inflow, a series of outflows for a number of years, and then an inflow during the terminal year. With two changes of sign, there may be, in practice frequently two solutions for the IRR.

Question 4

M/s Gama & Co. is planning of installing a power saving machine and are considering buying or leasing alternative. The machine is subject to straight-line method of depreciation. Gama & Co. can raise debt at 14% payable in five equal annual instalments of ₹ 1,78,858 each, at the

beginning of the year. In case of leasing, the company would be required to pay an annual end of year rent of 25% of the cost of machine for 5 years.

The Company is in 40% tax bracket. The salvage value is estimated at ₹ 24,998 at the end of 5 years.

Evaluate the two alternatives and advise the company by considering after tax cost of debt concept under both alternatives.

P.V. factors 0.9225, 0.8510, 0.7851, 0.7242, 0.6681 respectively for 1 to 5 years.

Answer

CALCULATION OF COST OF THE MACHINE

Beginning of Year	Cl. Balance at the beginning	Installment	Interest	Principal component
5	0	1,78,858	21,965	1,56,893
4	1,56,893	1,78,858	41,233	1,37,625
3	2,94,518	1,78,858	58,134	1,20,724
2	4,15,242	1,78,858	72,960	1,05,898
1	5,21,140	1,78,858	0	1,78,858
		Total		6,99,998

Cost of the machine is ₹ 6,99,998

Alternatively it can be computed as follows:

$$\text{Annual Payment} = \frac{\text{Cost of Machine}}{\text{PVAF}(14\%,0-4)}$$

$$1,78,858 = \frac{\text{Cost of Machine}}{3.91371}$$

Cost of Machine = 6,99,998

Year	Total Payment	Interest	Principal component	Principal Outstanding
0	1,78,858	0	1,78,857	5,21,139
1	1,78,858	72,959	1,05,899	4,15,240
2	1,78,858	58,134	1,20,725	2,94,516
3	1,78,858	41,232	1,37,626	1,56,890
4	1,78,858	21,964	1,56,894	0
Total			6,99,997	

Buying Option

Depreciation p.a. = $\frac{₹\ 6,99,998 - ₹\ 24,998}{5} = \frac{₹\ 6,75,000}{5}$

Depreciation p.a. = ₹ 1,35,000

Tax Saving on interest & Depreciation

Year	Interest (₹)	Dep. (₹)	Total (₹)	Tax Saving (₹)
1	72,960	1,35,000	2,07,960	83,184
2	58,134	1,35,000	1,93,134	77,254
3	41,233	1,35,000	1,76,233	70,493
4	21,965	1,35,000	1,56,965	62,786
5	0	1,35,000	1,35,000	54,000

P.V. Out flow

Year	Installment (₹)	Tax Saving (₹)	Net outflow (₹)	PV @8.4%	P.V. (₹)
0	1,78,858	0	1,78,858	1.0000	1,78,858.00
1	1,78,858	83,184	95,674	0.9225	88,259.26
2	1,78,858	77,254	1,01,604	0.8510	86,465.36
3	1,78,858	70,493	1,08,365	0.7851	85,077.34
4	1,78,858	62,786	1,16,072	0.7242	84,059.40
5		54,000	-54,000	0.6681	-36,077.00
					4,86,641.47
	Salvage Value		24,998	0.6681	16,701.17
	P.V. of Outflow				4,69,940.30

Leasing Option

Lease Rent 25% of ₹ 6,99,998 i.e. ₹ 1,74,999.50 app. ₹ 1,75,000

Lease Rent payable at the end of the year

Year	Lease Rental (₹)	Tax Saving (₹)	Net outflow (₹)	PV @8.4%	P.V. (₹)
1-5	1,75,000	70,000	1,05,000	3.9509	4,14,844.50

Decision – The company is advised to opt for leasing as the total PV of cash outflow is lower by ₹ 55,095.80

Question 5

XYZ Ltd. requires an equipment costing ₹ 10,00,000; the same will be utilized over a period of 5 years. It has two financing options in this regard :

(i) Arrangement of a loan of ₹ 10,00,000 at an interest rate of 13 percent per annum; the loan being repayable in 5 equal year end installments; the equipment can be sold at the end of fifth year for ₹1,00,000.

(ii) Leasing the equipment for a period of five years at an early rental of ₹3,30,000 payable at the year end.

The rate of depreciation is 15 percent on Written Down Value (WDV) basis, income tax rate is 35 percent and discount rate is 12 percent.

Advise which of the financing options should XYZ Ltd. exercise and why?

Answer

Option A

The loan amount is repayable together with the interest at the rate of 13% on loan amount and is repayable in equal installments at the end of each year. The PVAF at the rate of 13% for 5 years is 3.5172, the amount payable will be

$$\text{Annual Payment} = \frac{₹\,10,00,000}{3.5172} = ₹\ 2,84,320 \text{ (rounded)}$$

Schedule of Debt Repayment

End of Year	Total Payment ₹	Interest ₹	Principal ₹	Principal Amount Outstanding ₹
1	2,84,320	1,30,000	1,54,320	8,45,680
2	2,84,320	1,09,938	1,74,382	6,71,298
3	2,84,320	87,269	1,97,051	4,74,247
4	2,84,320	61,652	2,22,668	2,51,579
5	2,84,320	32,741*	2,51,579	------

* Balancing Figure

Schedule of Cash Outflows: Debt Alternative

(Amount in ₹)

(1)	*(2)*	*(3)*	*(4)*	*(3) + (4)*	*(5)*	*(6)*	*(7)*	*(8)*
End of year	*Debt Payment*	*Interest*	*Dep*		*Tax Shield [(3)+(4)] 0.35*	*Cash outflows (2) – (5)*	*PV factors @ 12%*	*PV*
1	2,84,320	1,30,000	1,50,000	2,80,000	98,000	1,86,320	0.893	1,66,384
2	2,84,320	1,09,938	1,27,500	2,37,438	83,103	2,01,217	0.797	1,60,370
3	2,84,320	87,269	1,08,375	1,95,644	68,475	2,15,845	0.712	1,53,682
4	2,84,320	61,652	92,119	1,53,771	53,820	2,30,500	0.636	1,46,598
5	2,84,320	32,741	78,301	1,11,042	38,865	2,45,4565	0.567	1,39,173
								7,66,207
Less: PV of Salvage Value								(56,700)
								7,09,507

Total present value of Outflows = ₹ 7,09,508

Option B

Lease Rent	330,000
Tax Shield	(115,500)
Outflow	2,14,500
	× 3.605
	₹ 7,73,273

Since PV of outflows is lower in the Borrowing option, XYZ Ltd. should avail of the loan and purchase the equipment.

Question 6

Sundaram Ltd. discounts its cash flows at 16% and is in the tax bracket of 35%. For the acquisition of a machinery worth ₹10,00,000, it has two options – either to acquire the asset by taking a bank loan @ 15% p.a. repayable in 5 yearly installments of ₹2,00,000 each plus interest or to lease the asset at yearly rentals of ₹3,34,000 for five (5) years. In both the cases, the instalment is payable at the end of the year. Depreciation is to be applied at the rate of 15% using 'written down value' (WDV) method. You are required to advise which of the financing options is to be exercised and why.

Year	*1*	*2*	*3*	*4*	*5*
P.V factor @16%	*0.862*	*0.743*	*0.641*	*0.552*	*0.476*

Answer

Alternative I: Acquiring the asset by taking bank loan:

Years		1	2	3	4	5
(a)	Interest (@15% p.a. on opening balance)	150,000	120,000	90,000	60,000	30,000
	Depreciation (@15%WDV)	150,000	127,500	108,375	92,119	78,301
		300,000	247,500	198,375	152,119	108,301
(b)	Tax shield (@35%)	105,000	86,625	69,431	53,242	37,905
	Interest less Tax shield (a)-(b)	45,000	33,375	20,569	6,758	(-)7,905
	Principal Repayment	2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
	Total cash outflow	2,45,000	2,33,375	2,20,569	2,06,758	1,92,095
	Discounting Factor @ 16%	0.862	0.743	0.641	0.552	0.476
	Present Value	2,11,190	1,73,398	1,41,385	1,14,130	91,437

Total P.V of cash outflow = ₹731,540

Alternative II: Acquire the asset on lease basis

Year	Lease Rentals ₹	Tax Shield @35%	Net Cash Outflow	Discount Factor	Present Value
1	3,34,000	1,16,900	2,17,100	0.862	1,87,140
2	3,34,000	1,16,900	2,17,100	0.743	1,61,305
3	3,34,000	1,16,900	2,17,100	0.641	1,39,161
4	3,34,000	1,16,900	2,17,100	0.552	1,19,839
5	3,34,000	1,16,900	2,17,100	0.476	1,03,340
				Present value of Total Cash out flow	7,10,785

Advice -By making Analysis of both the alternatives, it is observed that the present value of the cash outflow is lower in alternative II by ₹20,755 (i.e.₹731,540 – ₹7,10,785) Hence, it is suggested to acquire the asset on lease basis.

Question 7

ABC Ltd. is considering a proposal to acquire a machine costing ₹ 1,10,000 payable ₹ 10,000 down and balance payable in 10 annual equal instalments at the end of each year inclusive of interest chargeable at 15%. Another option before it is to acquire the asset on a lease rental of

₹ 15,000 per annum payable at the end of each year for 10 years. The following information is also available.

(i) Terminal Scrap value of ₹ 20,000 is realizable, if the asset is purchased.

(ii) The company provides 10% depreciation on straight line method on the original cost.

(iii) Income tax rate is 50%.

You are required to compute the analyse cash flows and to advise as to which option is better.

Answer

Option I: To buy the asset:

In this option the firm has to pay ₹ 10,000 down and the balance ₹ 1,00,000 together with interest @ 15% is payable in 10 annual equal instalments. The instalment amount may be calculated by dividing ₹ 1,00,000 by the PVAF for 10 years at 15% i.e.

Annual repayment = ₹ 1,00,000/5.0188 = ₹ 19,925

The cash flows of the borrowing and purchase option may be computed as follows:

Year	*Instalment*	*Interest*	*Repayment*	*Balance*
	₹	*₹*	*₹*	*₹*
1	19,925	15,000	4,925	95,075
2	19,925	14,261	5,664	89,411
3	19,925	13,412	6,513	82,898
4	19,925	12,435	7,490	75,408
5	19,925	11,311	8,614	66,794
6	19,925	10,019	9,906	56,888
7	19,925	8,533	11,392	45,496
8	19,925	6,824	13,101	32,395
9	19,925	4,859	15,066	17,329
10	19,925	2,596*	17,329	–

***** Difference between the outstanding balance and the last instalment (i.e. ₹ 19,925 – ₹ 17,329 = ₹ 2,596)

Year	*Installment*	*Interest*	*Depreciation*	*Tax Shield 50% (2 + 3)*	*Net CF (1-4)*	*PVF*	*PV*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
	₹	*₹*	*₹*	*₹*	*₹*		*₹*
0	10,000	–	–	–	–	1.000	10,000
1	19,925	15,000	11,000	13,000	6,925	.870	6,025

2	19,925	14,261	11,000	12,631	7,294	.756	5,514
3	19,925	13,412	11,000	12,206	7,719	.658	5,079
4	19,925	12,435	11,000	11,718	8,207	.572	4,694
5	19,925	11,311	11,000	11,156	8,769	.497	4,358
6	19,925	10,019	11,000	10,510	9,415	.432	4,067
7	19,925	8,533	11,000	9,767	10,158	.376	3,819
8	19,925	6,824	11,000	8,912	11,013	.327	3,601
9	19,925	4,859	11,000	7,930	11,995	.284	3,407
10	19,925	2,596	11,000	6,798	13,127	.247	3,242
	Present value of total outflows						–53,806
10	Salvage value (after tax)		10,000	–	–	.247	+2,470
	Net present value of outflows						–51,336

It may be noted that (i) depreciation of ₹ 11,000 has been provided for all the 10 years. This is 10% of the original cost of ₹ 1,10,000. (ii) The asset is fully depreciated during its life of 10 years, therefore, the book value at the end of 10th year would be zero. As the asset is having a salvage value of ₹ 20,000, this would be capital gain and presuming it to be taxable at the normal rate of 50%, the net cash inflow on account of salvage value would be ₹ 10,000 only. This is further discounted to find out the present value of this inflow.

Option II – Evaluation of Lease Option:

In case the asset is acquired on lease, there is a lease rent of ₹ 15,000 payable at the end of next 10 years. This lease rental is tax deductible, therefore, the net cash outflow would be only ₹ 7,500 (after tax). The PVAF for 10 years @ 15% is 5.0188. So, the present value of annuity of ₹ 7,500 is

Present value of annuity of outflow = ₹ 7,500 × 5.0188 = ₹ 37,641.

Advice: If the firm opts to buy the asset, the present value of outflow comes to ₹ 51,336; and in case of lease option, the present value of outflows comes to ₹ 37,641. Hence, the firm should opt for the lease option. In this way, the firm will be able to reduce its costs by ₹ 13,695 i.e. ₹ 51,336 – ₹ 37,641. This may also be referred to as Net Benefit of Leasing.

Note: Students may also discount cash flows under both alternatives at after tax cost i.e. 15% (1 – 0.5) = 7.5%. Discounting will not have any impact on this decision since any discount factor will lead to present value of lease to be less than that of present value of debt.

Question 8

Engineers Ltd. is in the business of manufacturing nut bolts. Some more product lines are being planned to be added to the existing system. The machinery required may be bought or may be taken on lease. The cost of machine is ₹ 20,00,000 having a useful life of 5 years with the salvage value of ₹ 4,00,000 (consider short term capital loss/gain for the Income tax). The full purchase value of machine can be financed by bank loan at the rate of 20% interest repayable in five equal instalments falling due at the end of each year. Alternatively, the

machine can be procured on a 5 years lease, year-end lease rentals being ₹ 6,00,000 per annum. The Company follows the written down value method of depreciation at the rate of 25 per cent. Company's tax rate is 35 per cent and cost of capital is 14 per cent.

(i) Advise the company which option it should choose – lease or borrow.

(ii) Assess the proposal from the lessor's point of view examining whether leasing the machine is financially viable at 14 per cent cost of capital.

Detailed working notes should be given.

Answer

Discounting Factor:

Cost of finance 20% - Tax 35% = 13%.

(i) PV of cash outflows under leasing alternative

Year-end	*Lease rent after taxes P.A.*	*PVIFA at 13%*	*Total P.V.*
1 – 5	₹ 3,90,000	3.517	₹ 13,71,630

PV of cash outflows under buying alternative

Year end	*Loan Instalment*	*Tax advantage on Interest*	*Tax advantage on Depreciation*	*Net Cash Outflow*	*PVIF at 13%*	*Total PV*
1	6,68,673	1,40,000	1,75,000	3,53,673	0.885	3,13,001
2	6,68,673	1,21,193	1,31,250	4,16,230	0.783	3,25,908
3	6,68,673	98,624	98,438	4,71,611	0.693	3,26,826
4	6,68,673	71,542	73,828	5,23,303	0.613	3,20,785
5	6,68,673	38,819	55,371	5,74,483	0.543	3,11,944
		Total PV outflows				15,98,464
		Less: PV of Salvage Value (₹ 4,00,000 *0.543)				2,17,200
						13,81,264
		Less: PV of tax saving on short term capital loss (4,74,609 – 4,00,000) * 35% * .543				14,179
		NPV of Cash outflow				13,67,085

Working Notes:

(1) Schedule of Debt Payment

Year-end	*Opening balance*	*Interest @ 20%*	*Repayment*	*Closing Balance*	*Principal Amount*
1	20,00,000	4,00,000	6,68,673	17,31,327	2,68,673
2	17,31,327	3,46,265	6,68,673	14,08,919	3,22,408

3	14,08,919	2,81,784	6,68,673	10,22,030	3,86,889
4	10,22,030	2,04,406	6,68,673	5,57,763	4,64,267
5	5,57,763	1,10,910*	6,68,673	0	5,57,763

*Balancing Figure

(2) Schedule of Depreciation

Year	*Opening WDV*	*Depreciation*	*Closing WDV*
1	20,00,000	5,00,000	15,00,000
2	15,00,000	3,75,000	11,25,000
3	11,25,000	2,81,250	8,43,750
4	8,43,750	2,10,938	6,32,812
5	6,32,812	1,58,203	4,74,609

(3) EMI = ₹ 20,00,000 / Annuity for 5 years @ 20% = i.e. ₹ 20,00,000 / 2.991 = ₹ 6,68,673.

Advice: Company is advised to borrow and buy not to go for leasing as NPV of cash outflows is lower in case of buying alternative.

Note: Students may note that the cost of capital of the company given in the question is 14% at which cash flows may also be discounted.

(ii) Evaluation from Lessor's Point of View

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Lease Rent	6,00,000	6,00,000	6,00,000	6,00,000	6,00,000
Less: Depreciation	5,00,000	3,75,000	2,81,250	2,10,938	1,58,203
EBT	1,00,000	2,25,000	3,18,750	3,89,062	4,41,797
Less: Tax @ 35%	35,000	78,750	1,11,563	1,36,172	1,54,629
EAT	65,000	1,46,250	2,07,187	2,52,890	2,87,168
Add: Depreciation	5,00,000	3,75,000	2,81,250	2,10,938	1,58,203
Cash Inflows	5,65,000	5,21,250	4,88,437	4,63,828	4,45,371
PV factor @ 14%	0.877	0.769	0.675	0.592	0.519
PV of inflows	4,95,505	4,00,841	3,29,695	2,74,586	2,31,148

Evaluation:

Aggregate PV of cash inflows	17,31,775
Add: PV of salvage value (4,00,000 × 0.519)	2,07,600

Add: Tax shelter on short-term capital loss (4,74,609 – 4,00,000) × 0.35 × 0.519	13,553
PV of all cash inflows	19,52,928
Cost of the machine	20,00,000
NPV	–47,072

Hence, leasing at this rate is not feasible.

Question 9

ABC Ltd. is contemplating have an access to a machine for a period of 5 years. The company can have use of the machine for the stipulated period through leasing arrangement or the requisite amount can be borrowed to buy the machine. In case of leasing, the company received a proposal to pay annual end of year rent of ₹ 2.4 lakhs for a period of 5 years.

In case of purchase (which costs ₹10,00,000/-) the company would have a 12%, 5 years loan to be paid in equated installments, each installment becoming due to the beginning of each years. It is estimated that the machine can be sold for ₹2,00,000/- at the end of 5th year. The company uses straight line method of depreciation. Corporate tax rate is 30%. Post tax cost of capital of ABC Ltd. is 10%.

You are required to advice

(i) Whether the machine should be bought or taken on lease.

(ii) Analyse the financial viability from the point of view of the lessor assuming 12% post tax cost of capital.

	PV of ₹1@10% for 5 years	***PV of ₹1 @ 12% for 5 years***
1	*.909*	*.893*
2	*.826*	*.797*
3	*.751*	*.712*
4	*.683*	*.636*
5	*.621*	*.567*

Answer

(i) Calculation of loan installment:

₹10,00,000 / (1+ PVIFA 12%, 4)

₹10,00,000 / (1 + 3.038) = ₹ 2,47,647

Debt Alternative: Calculation of Present Value of Outflows

(Amount in ₹)

(1) End of year	*(2) Debt Payment*	*(3) Interest*	*(4) Dep.*	*(5) Tax Shield [(3)+(4)]x0.3*	*(6) Cash outflows (2) – (5)*	*(7) PV factors @ 10%*	*(8) PV*
0	2,47,647	0	0	0	2,47,647	1.000	2,47,647
1	2,47,647	90,282	1,60,000	75,085	1,72,562	0.909	1,56,859
2	2,47,647	71,398	1,60,000	69,419	1,78,228	0.826	1,47,216
3	2,47,647	50,249	1,60,000	63,075	1,84,572	0.751	1,38,614
4	2,47,647	26,305*	1,60,000	55,892	1,91,755	0.683	1,30,969
5	0	0	1,60,000	48,000	(48,000)	0.621	(29,808)
							7,91,497
Less: Salvage Value ₹ 2,00,000 x 0.621							1,24,200
Total Present Value of Outflow							6,67,297

*balancing figure

Leasing Decision: Calculation of Present Value of Outflows

Yrs. 1-5 ₹2,40,000 x (1 - 0.30) x 3.790 = ₹6,36,720

Decision: Leasing option is viable.

(ii) From Lessor's Point of View

		(₹)
Cost of Machine		(-) 10,00,000
PV of Post tax lease Rental (₹2,40,000 x 0.7 x 3.605)	6,05,640	
PV of Depreciation tax shield (₹1,60,000 x 0.3 x 3.605)	1,73,040	
PV of salvage value (₹2,00,000 x 0.567)	1,13,400	8,92,080
NPV		(-) 1,07,920

Decision – Leasing proposal is not viable.

Question 10

ABC Company has decided to acquire a ₹ 5,00,000 pulp control device that has a useful life of ten years. A subsidy of ₹ 50,000 is available at the time the device is acquired and placed into service. The device would be depreciated on straight-line basis and no salvage value is expected. The company is in the 50% tax bracket. If the acquisition is financed with a lease,

lease payments of ₹ 55,000 would be required at the beginning of each year. The company can also borrow at 10% repayable in equal instalments. Debt payments would be due at the beginning of each year:

(i) What is the present value of cash outflow for each of these financing alternatives, using the after-tax cost of debt?

(ii) Which of the two alternatives is preferable?

Answer

Initial amount borrowed = ₹ 5,00,000 – ₹ 50,000 = ₹ 4,50,000

This amount of ₹4,50,000 is the amount which together with interest at the rate of 10% on outstanding amount is repayable in equal installments i.e., annuities in the beginning of each of 10 years. The PVAF at the rate of 10% for 9 years is 5.759 and for the year 0 it is 1.000. So, the annuity amount may be ascertained by dividing ₹4,50,000 by (5.759 + 1.000).

So Annual payment = ₹4,50,000/6.759 = ₹66,578

Amount owed at time 0 = ₹4,50,000 – ₹ 66,578 = ₹3,83,422.

Schedule of Debt Payment

End of Year	Total Payment ₹	Interest ₹	Principal Amount Outstanding ₹
0	66,578	0	3,83,422
1	66,578	38,342	3,55,186
2	66,578	35,519	3,24,127
3	66,578	32,413	2,89,962
4	66,578	28,996	2,52,380
5	66,578	25,238	2,11,040
6	66,578	21,104	1,65,566
7	66,578	16,557	1,15,545
8	66,578	11,555	60,522
9	66,578	6,056*	NIL

* Balancing Figure

Schedule of Cash Outflows: Debt Alternative

(Amount in ₹)

(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
End of year	*Debt Payment*	*Interest*	*Dep*	*Tax Shield [(3)+(4)]0.5*	*Cash outflows (2) – (5)*	*PV factors @ 5%*	*PV*
0	66,578	0	0	0	66,578	1.000	66,578
1	66,578	38,342	50,000	44,171	22,407	0.952	21,331
2	66,578	35,519	50,000	42,759	23,819	0.907	21,604
3	66,578	32,413	50,000	41,206	25,372	0.864	21,921
4	66,578	28,996	50,000	39,498	27,080	0.823	22,287
5	66,578	25,238	50,000	37,619	28,959	0.784	22,704
6	66,578	21,104	50,000	35,552	31,026	0.746	23,145
7	66,578	16,557	50,000	33,279	33,299	0.711	23,676
8	66,578	11,555	50,000	30,777	35,801	0.677	24,237
9	66,578	6,056	50,000	28,028	38,550	0.645	24,865
10	-	0	50,000	25,000	(-25,000)	0.614	(-15,350)
Total present value of Outflows							2,56,998

Schedule of Cash Outflows: Leasing Alternative

(Amount in ₹)

End of year	*Lease Payment*	*Tax Shield*	*Cash Outflow*	*PVIFA @ 5%*	*PV*
0	55,000	0	55,000	1.000	55,000
1-9	55,000	27,500	27,500	7.109	1,95,498
10	0	27,500	-27,500	0.614	(-16,885)
Total Present value of Outflows					2,33,613

The present values of cash outflow are ₹2,56,998 and ₹2,33,613 respectively under debt and lease alternatives. As under debt alternatives the cash outflow would be more, the lease is preferred.

Note: (i) The repayment of loan as well as payment of lease rental is made in the beginning of the years. So, at the end of year 10, there will not be any payment in either option, but the

tax benefit of depreciation for the year 10 as well as of lease rentals paid in the beginning of year 10, will be available only a the end of year 10.

(ii) Students may also calculate depreciation after subtracting the amount of subsidy from original cost, however, even in this situation, lease alternative is preferable.

Question 11

Agrani Ltd. is in the business of manufacturing bearings. Some more product lines are being planned to be added to the existing system. The machinery required may be bought or may be taken on lease. The cost of machine is ₹ 40,00,000 having a useful life of 5 years with the salvage value of ₹ 8,00,000. The full purchase value of machine can be financed by 20% loan repayable in five equal instalments falling due at the end of each year. Alternatively, the machine can be procured on a 5 years lease, year-end lease rentals being ₹ 12,00,000 per annum. The Company follows the written down value method of depreciation at the rate of 25%. Company's tax rate is 35 per cent and cost of capital is 16 per cent:

(i) Advise the company which option it should choose – lease or borrow.

(ii) Assess the proposal from the lessor's point of view examining whether leasing the machine is financially viable at 14% cost of capital (Detailed working notes should be given. Calculations can be rounded off to ₹ lakhs).

Answer

(i) P.V. of Cash outflow under lease option

(in ₹)

Year	*Lease Rental after tax*	*PVIFA @ 13%*	*Total P.V.*
1 – 5	12,00,000 (I – T) = 7,80,000	20% (I – T) 3.517	27,43,260

Cash Outflow under borrowing option

5 equal instalments

₹ 40,00,000 ÷ 2.991 (PVIFA 20%) = 13,37,345

Tax Advantage

Year	*Loan Instalments*	*On Interest*	*On Depreciation*	*Net Cash Outflow*	*PVIF 13%*	*Total PV*
1	13,37,345	2,80,000	3,50,000	7,07,345	.885	6,26,000
2	13,37,345	2,48,386	2,62,500	8,26,459	.783	6,47,117
3	13,37,345	1,97,249	1,96,875	9,43,221	.693	6,53,652
4	13,37,345	1,43,085	1,47,656	10,46,604	.613	6,41,568

5	13,37,345	77,635	1,10,742	11,48,968	.543	6,23,890
						31,92,227
Total PV						31,92,227
Less: PV Salvage value adjusted for Tax savings on loss of sale of machinery (₹ 8,00,000 × .543 = ₹ 4,34,400) + (₹ 28,359) (See Working Note on Depreciation) 9,49,219 – 8,00,000 = 1,49,219 × .35 × .543 = 28,359						4,62,759
Total present value of cash outflow						27,29,468

Decision: PV of cash outflow of lease option is greater than borrow option and hence borrow option is recommended.

Working Notes:

1. Debt and Interest Payments

Year	*Loan Instalments*	*Loan at the beginning of the year*	*Interest*	*Principal*	*Balance at the end of year*
1	13,37,345	40,00,000	8,00,000	5,37,345	34,62,655
2	13,37,345	34,62,655	6,92,531	6,44,814	28,17,841
3	13,37,345	28,17,841	5,63,568	7,73,777	20,44,064
4	13,37,345	20,44,064	4,08,813	9,28,532	11,15,532
5	13,37,345	11,15,532	2,21,813*	11,15,532	-

* Balancing Figure

2.

Year		*Depreciation*
1	40,00,000 × .25	10,00,000
2	30,00,000 × .25	7,50,000
3	22,50,000 × .25	5,62,500
4	16,87,500 × .25	4,21,875
5	12,65,625 × .25	3,16,406

B.V. of machine = 12,65,625 – 3,16,406 = 9,49,219.

(ii) Proposal from the View Point of Lessor

Lessor's Cash Flow

	1	*2*	*3*	*4*	*5*
Lease Rentals	12,00,000	12,00,000	12,00,000	12,00,000	12,00,000
Less: Dep. (A)	10,00,000	7,50,000	5,62,500	4,21,875	Nil
EBT	2,00,000	4,50,000	6,37,500	7,78,125	12,00,000
Less: Tax @ 35%	70,000	1,57,500	2,23,125	2,72,344	4,20,000
EAT (B)	1,30,000	2,92,500	4,14,375	5,05,781	7,80,000
CFAT	11,30,000	10,42,500	9,76,875	9,27,656	7,80,000
PV factor @ 14%	.877	.769	.675	.592	.519
PV	9,91,010	8,01,683	6,59,391	5,49,172	4,04,820

PV of Lease Rent	34,06,076
Add: PV of Salvage Value	4,15,200
Add: PV of Tax Saving on loss of sale of asset	84,581
Total PV of cash inflow	39,05,857
Cost of Machine	40,00,000
NPV	(94,143)

Decision: Lease rate is not financially viable. Hence, not recommended.

Question 12

Your company is considering acquiring an additional computer to supplement its time-share computer services to its clients. It has two options:

(i) To purchase the computer for ₹ 22 lakhs.

(ii) To lease the computer for three years from a leasing company for ₹ 5 lakhs as annual lease rent plus 10% of gross time-share service revenue. The agreement also requires an additional payment of ₹ 6 lakhs at the end of the third year. Lease rents are payable at the year-end, and the computer reverts to the lessor after the contract period.

The company estimates that the computer under review will be worth ₹ 10 lakhs at the end of third year.

Forecast Revenues are:

Year	*1*	*2*	*3*
Amount (₹ in lakhs)	*22.5*	*25*	*27.5*

Annual operating costs excluding depreciation/lease rent of computer are estimated at ₹ 9 lakhs with an additional ₹ 1 lakh for start up and training costs at the beginning of the

first year. These costs are to be borne by the lessee. Your company will borrow at 16% interest to finance the acquisition of the computer. Repayments are to be made according to the following schedule:

Year end	*1*	*2*	*3*
Principal (₹'000)	*500*	*850*	*850*
Interest (₹'000)	*352*	*272*	*136*

The company uses straight line method (SLM) to depreciate its assets and pays 50% tax on its income. The management approaches you to advice. Which alternative would be recommended and why?

Note: The PV factor at 8% and 16% rates of discount are:

Year	*1*	*2*	*3*
8%	*0.926*	*0.857*	*0.794*
16%	*0.862*	*0.743*	*0.641*

Answer

Working Notes:

(a) Depreciation: ₹ 22,00,000 – 10,00,000/3 = ₹ 4,00,000 p.a.

(b) Effective rate of interest after tax shield: .16 × (1 - .50) = .08 or 8%.

(c) Operating and training costs are common in both alternatives hence not considered while calculating NPV of cash flows.

Calculation of NPV

1. Alternative I: Purchase of Computer

Particulars	*Year 1*	*Year 2*	*Year 3*
	₹	*₹*	*₹*
Instalment Payment			
Principal	5,00,000	8,50,000	8,50,000
Interest	3,52,000	2,72,000	1,36,000
Total (A)	8,52,000	11,22,000	9,86,000
Tax shield @ 50%;			
Interest payment	1,76,000	1,36,000	68,000
Depreciation	2,00,000	2,00,000	2,00,000
Total (B)	3,76,000	3,36,000	2,68,000
Net Cash outflows (A – B)	4,76,000	7,86,000	7,18,000

PV factor at 8%	0.926	0.857	0.794
PV of Cash outflows	4,40,776	6,73,602	5,70,092
Total PV of Cash outflows:			16,84,470
Less: PV of salvage value (₹ 10 lakhs × 0.794)			7,94,000
Net PV of cash outflows			8,90,470

2. Alternative II: Lease of the Computer

Particulars	*Year 1*	*Year 2*	*Year 3*
	₹	*₹*	*₹*
Lease rent	5,00,000	5,00,000	5,00,000
10% of gross revenue	2,25,000	2,50,000	2,75,000
Lump sum payment	–	–	6,00,000
Total Payment	7,25,000	7,50,000	13,75,000
Less: Tax shield @ 50%	3,62,500	3,75,000	6,87,500
Net Cash outflows	3,62,500	3,75,000	6,87,500
PV of Cash outflows @ 8%	3,35,675	3,21,375	5,45,875
Total PV of cash outflows			12,02,925

Recommendation: Since the Present Value (PV) of net cash outflow of Alternative I is lower, the company should purchase the computer.

Question 13

ABC Ltd. sells computer services to its clients. The company has recently completed a feasibility study and decided to acquire an additional computer, the details of which are as follows:

(1) The purchase price of the computer is ₹ 2,30,000; maintenance, property taxes and insurance will be ₹ 20,000 per year. The additional expenses to operate the computer are estimated at ₹ 80,000. If the computer is rented from the owner, the annual rent will be ₹ 85,000, plus 5% of annual billings. The rent is due on the last day of each year.

(2) Due to competitive conditions, the company feels that it will be necessary to replace the computer at the end of three years with a more advanced model. Its resale value is estimated at ₹ 1,10,000.

(3) The corporate income tax rate is 50% and the straight line method of depreciation is followed.

(4) The estimated annual billing for the services of the new computer will be ₹ 2,20,000 during the first year, and ₹ 2,60,000 during the subsequent two years.

(5) If the computer is purchased, the company will borrow to finance the purchase from a bank with interest at 16% per annum. The interest will be paid regularly, and the principal will be returned in one lump sum at the end of the year 3.

Should the company purchase the computer or lease it? Assume (i) straight line method of depreciation, (ii) salvage value of ₹ 1,10,000 and evaluate the proposal from the point of view of lessor if its cost of capital is also 12%.

Answer

Evaluation from the point of view of Lessee: The lessee has two alternatives: (i) To acquire the computer out of borrowed funds, and (ii) To acquire the computer on lease basis. The financial implications of these two options can be evaluated as follows:

Option I: To acquire computer out of borrowed funds. In this case, the company has to pay interest @ 16% annually and repayment of loan at the end of 3rd year. However, the salvage value of ₹1,10,000 will be available to it. The information can be presented as follows:

Year	*Interest*	*Depreciation*	*Expenses*	*Tax Shield (5)=50% of (2+3+4)*	*Cash outflows*	*PVF (8%)*	*PV (₹)*
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*6=(2+4-5)*		
1	₹36,800	₹40,000	₹20,000	₹48,400	₹8,400	.926	7,778
2	36,800	40,000	20,000	48,400	8,400	.857	7,199
3	36,800	40,000	20,000	48,400	8,400	.794	6,670
4	Repayment – Savage (2,30,000 –1,10,000)				₹1,20,000	.794	95,280
			Present Value of Outflows				1,16,927

Option II: To acquire the Computer on lease basis: In this case, the Company will be required to pay an annual lease rent of ₹85,000 + 5% of annual billing at the end of year. The financial implications can be evaluated as follows:

Year	*Rental*	*5% of Billing*	*Tax Shield*	*Cash Outflow*	*PV (8%)*	*(PV)*
	(1)	*(2)*	*(3)= (50% of 1+2)*	*(4)= (1+2+3)*		
1	₹85,000	₹11,000	₹48,000	₹48,000	.926	₹44,448
2	85,000	13,000	49,000	49,000	.857	41,993
3	85,000	13,000	49,000	49,000	.794	38,906
	Present Value of Outflows					1,25,347

As the PV of outflows is less in case of buying option, the Company should borrow funds to buyout the computer.

Note: 1. It may be noted that the additional expenses of ₹80,000 to operate the computer have not been considered in the above calculation. These expenses are required in both the options and are considered to be irrelevant to decide between lease or buy.

2. Alternatively, above analysis can also be carried out at 12% (Cost of Capital) instead of 8% as the final decision shall remain the same.

Evaluation from the point of view of lessor:

	Year 1	*Year 2*	*Year 3*
Lease Rental	85,000	85,000	85,000
5% of Billing	11,000	13,000	13,000
Total Income	96,000	98,000	98,000
Less: Maintenance Expenses	20,000	20,000	20,000
Depreciation	40,000	40,000	40,000
Income before tax	36,000	38,000	38,000
Tax @ 50%	18,000	19,000	19,000
Net Income after Tax	18,000	19,000	19,000
Depreciation added back	40,000	40,000	40,000
Cash Inflow (Annual)	58,000	59,000	59,000
Scrap Value	-	-	1,10,000
	58,000	59,000	1,69,000
PVF (12%)	0.893	0.797	0.712
Present Value	51,794	47,023	1,20,328
Total Present Value			2,19,145
Less: Initial Cost			2,30,000
Net Present Value			-10,855
As the NPV for the lessor is negative, he may not accept the proposal.			

Question 14

A Company is planning to acquire a machine costing ₹ 5,00,000. Effective life of the machine is 5 years. The Company is considering two options. One is to purchase the machine by lease and the other is to borrow ₹ 5,00,000 from its bankers at 10% interest p.a. The Principal amount of loan will be paid in 5 equal instalments to be paid annually. The machine will be sold at ₹ 50,000 at the end of 5th year. Following further informations are given:

(a) Principal, interest, lease rentals are payable on the last day of each year.

(b) The machine will be fully depreciated over its effective life.

(c) Tax rate is 30% and after tax. Cost of Capital is 8%.

Compute the lease rentals payable which will make the firm indifferent to the loan option.

Answer

(a) Borrowing option:

Annual Instalment = ₹5,00,000/- / 5 = ₹1,00,000/-

Annual depreciation = ₹5,00,000/- / 5 = ₹1,00,000/-

Computation of net cash outflow:

Year	*Principal (₹)*	*Interest (₹)*	*Total (₹)*	*Tax Saving Depn. & Interest (₹)*	*Net cash Outflow (₹)*	*PV @ 8%†*	*Total PV (₹)*
1	1,00,000	50,000	1,50,000	45,000	1,05,000	0.926	97,230
2	1,00,000	40,000	1,40,000	42,000	98,000	0.857	83,986
3	1,00,000	30,000	1,30,000	39,000	91,000	0.794	72,254
4	1,00,000	20,000	1,20,000	36,000	84,000	0.735	61,740
5	1,00,000	10,000	1,10,000	33,000	77,000	0.681	52,437
							3,67,647
Less: Present value of Inflows at the end of 5th year (₹50,000/- x 0.7) or ₹35,000 x 0.681 =							23,835
PV of Net Cash outflows							3,43,812

Calculation of lease rentals:

Therefore, Required Annual after tax outflow = 3,43,812/3.993 = ₹86,104/-*

Therefore, Annual lease rental = 86,104/0.70 = ₹1,23,006/-

* If it is assumed that installment is payable in the beginning of the year then lease rent shall be computed as follows:

Required Annual after tax outflow = 3,43,812/4.312 = ₹79,734/-

Therefore, Annual lease rental = 79,734/0.70 = ₹1,13,906/-

Further, if it is assumed that the lease rent is payable in the beginning of the year and tax benefit accrue in arrears then lease rent shall be computed as follows:

Let 'R' be the lease rent

PV of Lease Rent = 4.312R

PV of Tax Benefits = 3.933 x 0.30R = 1.1979R

Accordingly

3,43,812 = 4.312R - 1.1979R

R = 1,10,405

Thus, lease rent at which lessor will be Break Even = ₹1,10,405

† Alternatively, it can also be discounted at post tax cost of debt i.e. 10.00% (1 - 0.30) = 7.00%.

Question 15

The Finance manager of ABC Corporation is analyzing firms policy regarding computers which are now being leased on yearly basis on rental amounting to ₹ 1,00,000 per year. The computers can be bought for ₹ 5,00,000. The purchase would be financed by 16% and the loan is repayable in 4 equal annual installments.

On account of rapid technological progress in the computer industry, it is suggested that a 4-year economic life should be used instead of a 10-year physical life. It is estimated that the computers would be sold for ₹ 2,00,000 at the end of 4 years.

The company uses the straight line method of depreciation. Corporate tax rate is 35%.

(i) Whether the equipment be bought or be taken on lease?

(ii) Analyze the financial viability from the point of view of the lessor, assuming 14% cost of capital.

(iii) Determine the minimum lease rent at which lessor would break even.

Answer

(i) The loan amount is repayable together with the interest at the rate of 16% on loan amount and is repayable in equal installments at the end of each year. The PVAF at the rate of 16% for 4 years is 2.798, the amount payable will be

$$\text{Annual Payment} = \frac{₹\ 5,00,000}{2.798} = ₹\ 1,78,699 \text{ (rounded)}$$

Schedule of Debt Repayment

End of Year	Total Principal ₹	Interest ₹	Principal ₹	Principal Amount Outstanding ₹
1	5,00,000	80,000	98,699	4,01,301
2	4,01,301	64,208	1,14,491	2,86,810
3	2,86,810	45,890	1,32,809	1,54,001
4	1,54,001	24,698*	1,54,001	------

* Balancing Figure

Tax Benefit on Interest and Depreciation

Year	*Interest*	*Depreciation*	*Total*	*Tax Benefit*
1	80,000	75,000	1,55,000	54,250
2	64,208	75,000	1,39,208	48,723
3	45,890	75,000	1,20,890	42,312
4	24,698	75,000	99,698	34,894

Present Value of Cash Flows under Borrow and Buying proposal

Year	Installment ₹	Salvage Value (₹)	Tax Benefit (₹)	Net Flow (₹)	PVF @ 10.4%	PV (₹)
1	1,78,699		54,250	1,24,449	0.906	1,12,751
2	1,78,699		48,723	1,29,976	0.820	1,06,580
3	1,78,699		42,312	1,36,387	0.743	1,01,336
4	1,78,699	(2,00,000)	34,894	-56,195	0.673	-37,819
					3.142	2,82,848

Present Value of Cash Flows under Leasing Option

₹ 1,00,000 (1- 0.35) x 3.142 = ₹ 2,04,230

Hence leasing should be preferred as cash flow is least in this option.

(ii) Analyzing financial viability from Lessor's point of view

(a) Determination of Cash Flow after Tax

	₹
Annual Rent	1,00,000
Less: Depreciation	75,000
EBT	25,000
Less: Tax @ 35%	8,750
Profit after Tax	16,250
Add: Depreciation	75,000
	91,250

(b) Computation of Net Present Value

	₹
Present Value of Cash inflow (₹ 91,250 x 2.914)	2,65,903
Add: PV of Salvage Value (₹ 2,00,000 x 0.592)	1,18,400

	3,84,303
Purchase Price	(5,00,000)
NPV	(1,15,697)

Thus proposal is not financially viable from lessor's point of view.

(iii) Break Even Lease Rent

	₹
Cost of Computer	5,00,000
Less: PV of Salvage Value (₹ 2,00,000 x 0.592)	1,18,400
	3,81,600
PVIAF (14%,4)	2.914
CFAT Desired	1,30,954
Less: Depreciation	75,000
EAT	55,954
Add: Taxes	30,129
EBT	86,083
Add: Depreciation	75,000
Lease Rental (Desired)	1,61,083

Question 16

Armada Leasing Company is considering a proposal to lease out a school bus. The bus can be purchased for ₹5,00,000 and, in turn, be leased out at ₹1,25,000 per year for 8 years with payments occurring at the end of each year:

(i) Estimate the internal rate of return for the company assuming tax is ignored.

(ii) What should be the yearly lease payment charged by the company in order to earn 20 per cent annual compounded rate of return before expenses and taxes?

(iii) Calculate the annual lease rent to be charged so as to amount to 20% after tax annual compound rate of return, based on the following assumptions:

(i) Tax rate is 40%;

(ii) Straight line depreciation;

(iii) Annual expenses of ₹50,000; and

(iv) Resale value ₹1,00,000 after the turn.

Answer

(i) Payback period = $\frac{5,00,000}{1,25,000} = 4.00$

PV factor closest to 4.00 in 8 years is 4.078 at 18%

Thus IRR = 18%

Note: Students may also arrive at the answer of 18.63% instead of 18% if exact calculation are made as follows:-

PV factor in 8 years at 19% is 3.9544

Interpolating for 4.00

$$IRR = 18\% + \frac{4.0776 - 4.000}{4.0776 - 3.9544} = 18.63\%$$

(ii) Desired lease rent to earn 20% IRR before expenses and taxes:

$$\text{Lease Rent} = \frac{5,00,000}{\text{PVIFA } 8 \text{ yr}, 20\%} = \frac{5,00,000}{3.837} = ₹\ 1,30,310.14 \text{ p.a.}$$

(iii) Revised lease rental on school bus to earn 20% return based on the given conditions.

PV factor [(X – E – D) (1 – T) + D] + (PV factor × S.V.) = Co

3.837 [(x – 50,000 – 50,000) (1 – .4) + 50,000] + (.233 × 1,00,000*) = 5,00,000

3.837 [.6x – 60,000 + 50,000)] + 23,300 = 5,00,000

2.3022x = 5,15,070

x = 2,23,729.47

This may be confirmed as lease rental	2,23,729.47
Less: Expenses + Depreciation	1,00,000.00
EBT	1,23,729.47
Less tax 40%	49,491.79
PAT	74,237.68
Add: Depreciation	50,000.00
CFAT	1,24,237.68

$$\frac{Co - PV \text{ of } SV}{CFAT} = \frac{5,00,000 - 23,300}{1,24,237.68} = 3.837 \text{ or } 20\%$$

*** Note:** Alternatively, STCG can also be considered as net of tax.

Question 17

ABC Leasing Ltd. has been approached by a client to write a five years lease on an asset costing ₹10,00,000 and having estimated salvage value of ₹1,00,000 thereafter. The company has a after tax required rate of return of 10% and its tax rate is 50%. It provides depreciation @33 ⅓ % on written down value of the asset. What lease rental will provide the company its after tax required rate of return?

Answer

In order to find out the annual lease rent, the cash flows from the asset must be evaluated as follows:

Year	*Depreciation (₹)*	*Tax Shield (₹)*	*Cash flow (₹)*	*PVF(10%)*	*PV (₹)*
1	3,33,333	1,66,667	1,66,666	.909	1,51,500
2	2,22,222	1,11,111	1,11,111	.826	91,778
3	1,48,148	74,074	74,074	.751	55,630
4	98,766	49,383	49,383	.683	33,728
5	65,844	32,922	32,922	.621	20,444
5	31,687*	15,843	15,843	.621	9,838
5	Salvage Value		1,00,000	.621	62,100
				Present Value of Inflows	4,25,018
				Outflow	10,00,000
				Net Present value	5,74,982

* Short Term Capital Loss

The firm therefore, should have total recovery of ₹5,74,982 through the lease rentals. The annual lease rental after tax may be calculated as follows:

Lease rental (after tax) = Total recovery required ÷ $PVAF_{(10\%n)}$

= ₹5,74,982 ÷ 3.791 = ₹1,51,670

Now, the lease rental before tax = ₹1,51,670 ÷ 0.5

= ₹3,03,340

Therefore, the firm should charge a lease rental of ₹3,03,340 in order to earn a required rate of return of 10% after tax.

Question 18

Fair finance, a leasing company, has been approached by a prospective customer intending to acquire a machine whose Cash Down price is ₹ 3 crores. The customer, in order to leverage his tax position, has requested a quote for a three year lease with rentals payable at the end of each year but in a diminishing manner such that they are in the ratio of 3 : 2 : 1.

Depreciation can be assumed to be on straight line basis and Fair Finance's marginal tax rate is 35%. The target rate of return for Fair Finance on the transaction is 10%.

Required:

Calculate the lease rents to be quoted for the lease for three years.

Answer

Capital sum to be placed under Lease

		₹ in lakhs
Cash Down price of machine		300.00
Less: Present value of depreciation Tax Shield		
$100 \times .35 \times \frac{1}{(1.10)}$	31.82	
$100 \times .35 \times \frac{1}{(1.10)^2}$	28.93	
$100 \times .35 \times \frac{1}{(1.10)^3}$	26.30	87.05
		212.95

If the normal annual lease rent per annum is x, then cash flow will be:

Year	*Post-tax cash flow*	*P.V. of post-tax cash flow*
1	$3x \times (1 - .35) = 1.95x$	$1.95x \times (1/1.10) = 1.7727x$
2	$2x \times (1 - .35) = 1.3x$	$1.30x \times [(1/(1.10)^2] = 1.0743x$
3	$x \times (1 - .35) = 0.65x$	$0.65x \times [1/(1.10)^3] = 0.4884x$
		$= 3.3354x$

Therefore $3.3354x = 212.95$ or x = ₹ 63.8454 lakhs

Year-wise lease rentals:

₹ in lakhs

Year 1	3 × 63.8454 lakhs	= 191.54
2	2 × 63.8454 lakhs	= 127.69
3	1 × 63.8454 lakhs	= 63.85

Question 19

Classic Finance, a Leasing Company, has been approached by a prospective customer intending to acquire a machine whose cash down price is ₹ 6 crores. The customer, in order to leverage his tax position, has requested a quote for a three year lease with rentals payable at the end of each year but in a diminishing manner such that they are in the ratio of 3 : 2 : 1. Depreciation can be assumed to be on WDV basis at 25% and Classic Finance's marginal tax rate is 35%. The target rate of return for Classic Finance on the transaction is 10%. You are required to calculate the lease rents to be quoted for the lease for three years.

Answer

Calculation of depreciation tax shield

(₹ Lakhs)

Year	Cost / WDV	Dep. @ 25 %	Tax shield @ 0.35	PVF	PV of dep. tax shield
1	600.00	150.00	52.50	0.909	47.72
2	450.00	112.50	39.38	0.826	32.53
3	337.50	84.38	29.53	0.751	22.18
					102.43

Capital sum to be placed on lease (₹ Lakhs)

Cash down price	600.00
Less: PV of depreciation tax shield	102.43
To be placed on lease	**497.57**

Let the normal annual lease rent were to be "*x*" then

Year	Post tax	PVF	PV of cash flow
1	3 x (1-0.35) or 1.95 *x*	0.909	1.773 *x*
2	2x (1-0.35) or 1.30*x*	0.826	1.074*x*
3	1x (1-0.35) or 0.65*x*	0.751	0.488*x*
			3.335 *x*

Value of *x* = ₹ 497.57 lakhs / 3.335 i.e ₹ 149.196 lakhs

Year wise lease rental will be

		₹lakhs
Year 1	3 × 149.196	447.59
Year 2	2 × 149.196	298.39
Year 3	1 × 149.196	149.20

Question 20

Front Leasing Ltd. is in the business of providing automobiles on wet lease to Corporate Clients. The company is considering a new model of battery run Tesla car for which a good number of enquiries is received. The cost of the vehicle is ₹ 25 lakhs. Its operating, maintenance and insurance costs are expected to be ₹ 5 lakh in the first year. Thereafter it will be subject to inflation annually @ 6 percent in the second and third year and @ 4 percent during fourth to sixth year. The useful life of the vehicle is six years. The net salvage value of the vehicle at the end of six year will be ₹10 lakh. Depreciation for Tax purposes will be 40 percent under Written Down Value (WDV) method. Marginal tax rate applicable is 35 percent. Its cost of capital 8 percent.

You are required to calculate the minimum annual lease rental that the company should quote. Assume that the cost of negotiation and lease administration is nil.

PVIF @ 8 percent is 0.926, 0.857, 0.794, 0.735, 0.681 and 0.630

Answer

In order to find out the annual rent, the cash flow from the asset must be evaluated as follows:

Year	Depreciation	Insurance (1)	Total	Tax Shield (2)	Net Outflow (1) – (2)
1	10,00,000	5,00,000	15,00,000	5,25,000	(25,000)
2	6,00,000	5,30,000	11,30,000	3,95,500	1,34,500
3	3,60,000	5,61,800	9,21,800	3,22,630	2,39,170
4	2,16,000	5,84,272	8,00,272	2,80,095	3,04,177
5	1,29,600	6,07,643	7,37,243	2,58,035	3,49,608
6	77,760	6,31,949	7,09,709	2,48,398	3,83,551

Computation of NPV

Year	Cash Flow	PVF@8%	PV
0	25,00,000	1	25,00,000
1	(25,000)	0.926	(23,150)
2	1,34,500	0.857	1,15,267
3	2,39,170	0.794	1,89,901
4	3,04,177	0.735	2,23,570

5	3,49,608	0.681	2,38,083
6	3,83,551	0.630	2,41,637
6	6,90,824*	0.630	(4,35,219)
		NPV	**30,50,089**

* 10,00,000 – [10,00,000 – 1,16,640] X 0.35

The firm should have a total recovery of ₹ 30,50,089 through lease rentals. The annual lease rental after tax may be calculated as follows:

Lease Rental (after tax) = Total Recovery Amount/PVAF (8%,6)

= ₹ 30,50,089/4.623 = ₹ 6,59,764

Now, lease rental before tax = ₹ 6,59,764/0.65 = ₹ 10,15,022

Question 21

M/s ABC Ltd. is to acquire a personal computer with modem and a printer. Its price is ₹ 60,000. ABC Ltd. can borrow ₹ 60,000 from a commercial bank at 12% interest per annum to finance the purchase. The principal sum is to be repaid in 5 equal year-end instalments.

ABC Ltd. can also have the computer on lease for 5 years.

The firm seeks your advise to know the maximum lease rent payable at each year end. Consider the following additional information:

(i) Interest on bank loan is payable at each year end.

(ii) The full cost of the computer will be written off over the effective life of computer on a straight-line basis. This is allowed for tax purposes.

(iii) At the end of year 5, the computer may be sold for ₹ 1,500 through a second -hand dealer, who will charge 8% commission on the sale proceeds.

(iv) The company's effective tax rate is 30%.

(v) The cost of capital is 11%.

Suggest the maximum annual lease rental for ABC Ltd. :

PV Factor at 11%

Year	PVF
1	0.901
2	0.812
3	0.731
4	0.659
5	0.593

Answer

Workings

(i)	Annual loan repayment: ₹ $\frac{60,000}{5}$	₹ 12,000
(ii)	Residual sale value at year 5	₹ 1,500
	(-) Commission at 8%	120
	Profit on sale	1380
	(-) Tax @ 30%	414
	Net cash flow (₹ 1,380 - ₹ 414)	₹966

(iii) Net cash outflow under loan option –

Year	1 (₹)	2 (₹)	3 (₹)	4 (₹)	5 (₹)	Total (₹)
Principal repayment	12,000	12,000	12,000	12,000	12,000	60,000
Payment of Interest	7,200	5,760	4,320	2,880	1,440	21,600
(-) Tax Savings @ 30% on depreciation	(3,600)	(3,600)	(3,600)	(3,600)	(3,600)	(18,000)
Tax savings on Interest	(2,160)	(1,728)	(1,296)	(864)	(432)	(6,480)
Net out flow	13,440	12,432	11,424	10,416	9,408	57,120
Discount factor at 11%	0.901	0.812	0.731	0.659	0.593	3.696
PV of cash outflow	12,109	10,095	8,351	6,864	5,579	42,998
Less: PV of Post tax inflow at the end of year 5 (₹ 966×0.593)						(573)
					PV of net Cash outflows in 5 years	42,425

Computation of Annual Lease Rentals:

PV of post tax Annual Lease Rentals in 5 years should not exceed ₹ 42,425.

Or say, PV of Post-tax Lease Rental for one year. Should not exceed

₹ $\frac{42,425}{3.696}$ = ₹11,479

₹11479 post-tax = [₹ 11,479/(1-t)] pretax

= ₹ 11,479/(1 - 0.30) = ₹16,398

Therefore, maximum pre-tax annual rental should be ₹16,398

Question 22

P Ltd. has decided to acquire a machine costing ₹50 lakhs through leasing. Quotations from 2 leasing companies have been obtained which are summarised below:

	Quote A	*Quote B*
Lease term	*3 years*	*4 years*
Initial lease rent (₹ lakhs)	*5.00*	*1.00*
Annual lease rent (payable in arrears) (₹ lakhs)	*21.06*	*19.66*

P Ltd. evaluates investment proposals at 10% cost of capital and its effective tax rate is 30%. Terminal payment in both cases is negligible and may be ignored.

Make calculations and show which quote is beneficial to P Ltd. Present value factors at 10% rate for years 1-4 are respectively 0.91, 0.83, 0.75 and 0.68. Calculations may be rounded off to 2 decimals in lakhs.

Answer

(in lakhs)

	Quote A	*Quote B*
Calculation of Present Value (PV) of cash payments:		
Initial lease rent (PV)	5.00	1.00
Less: PV of tax benefit on initial payment of lease rent		
₹ 5.00 lakh x 0.30 x 0.91	(1.365)	-
₹ 1.00 lakh x 0.30 x 0.91	-	(0.273)
PV of Annual lease rents		
₹ 21.06 lakh x 0.7 x 2.49	36.71	-
₹ 19.66 lakh x 0.7 x 3.17	-	43.63
Total payments in PV	**40.345**	**44.357**
Capital Recovery Factor (reciprocal of Annuity Factor)		
1/2.49	0.402	-
1/3.17	-	0.315
Equated Annual Payment or cash outflow (₹ lakhs)	**16.20**	**13.979**

Conclusion: Since Quote B implies lesser equated annual cash outflow, it is better.

Question 23

X Ltd. had only one water pollution control machine in this type of block of asset with no book value under the provisions of the Income Tax Act, 1961 as it was subject to rate of depreciation of 100% in the very first year of installation.

Due to funds crunch, X Ltd. decided to sell the machine which can be sold in the market to anyone for ₹ 5,00,000 easily.

Understanding this from a reliable source, Y Ltd. came forward to buy the machine for ₹ 5,00,000 and lease it to X Ltd. for lease rental of ₹ 90,000 p.a. for 5 years. X Ltd. decided to invest the net sale proceed in a risk free deposit, fetching yearly interest of 8.75% to generate some cash flow. It also decided to relook the entire issue afresh after the said period of 5 years.

Another company, Z Ltd. also approached X Ltd. proposing to sell a similar machine for ₹ 4,00,000 to the latter and undertook to buy it back at the end of 5 years for ₹ 1,00,000 provided the maintenance were entrusted to Z Ltd. for yearly charge of ₹ 15,000. X Ltd. would utilise the net sale proceeds of the old machine to fund this machine also should it accept this offer.

The marginal rate of tax of X Ltd. is 34% and its weighted average cost of capital is 12%.

Which Alternative would you recommend?

Discounting Factors @ 12%

Year	*1*	*2*	*3*	*4*	*5*
	0.893	*0.797*	*0.712*	*0.636*	*0.567*

Answer

First Option

	₹
Sale Proceeds	5,00,000
Tax @ 34%	1,70,000
Net Proceed	3,30,000
Interest @ 8.75% p.a.	= ₹ 28,875

NPV of this Option

	Year					
	0	1	2	3	4	5
Int. on Net Proceeds (₹)		28,875	28,875	28,875	28,875	28,875
Tax @ 34% (₹)		-9,818	-9,818	-9,818	-9,818	-9,818
Lease Rent (₹)		-90,000	-90,000	-90,000	-90,000	-90,000
Tax @34%(₹)		30,600	30,600	30,600	30,600	30,600
Terminal Cash Flow (₹)						3,30,000

Cash flow (₹)		-40,343	-40,343	-40,343	-40,343	2,89,657
PV Factor		0.893	0.797	0.712	0.636	0.567
PV of Cash Flows (₹)		-36,026	-32,153	-28,724	-25,658	1,64,236

NPV = ₹ 41,675

Second Option

	₹
Cost of New Machine	4,00,000
Net sale proceeds of old machine	3,30,000
Investment in Cash	70,000

NPV of this Option

	Year					
	0	1	2	3	4	5
Payment for new Machine (₹)	-70,000					
Tax saving ₹ 4,00,000 x 34%		1,36,000				
Maintenance (₹)		-15,000	-15,000	-15,000	-15,000	-15,000
Tax saving on above @ 34% (₹)		5,100	5,100	5,100	5,100	5,100
Terminal Cash Flow (₹)						1,00,000
Tax on above @ 34% (₹)						-34,000
Cash Flow (₹)	-70,000	1,26,100	-9,900	-9,900	-9,900	56,100
PV Factor	1	0.893	0.797	0.712	0.636	0.567
PV of Cash Flows (₹)	-70,000	1,12,607	-7,890	-7,049	-6,296	31,809

NPV = ₹ 53,181

The second alternative is recommended.

Alternative Solution

	₹
Sale of Old Machine	5,00,000
Cost of New Machine	4,00,000
Short Term Capital Gain	1,00,000
Tax on STCG	34,000
Net Proceeds	66,000

NPV of this Option

	Year					
	0	1	2	3	4	5
Sale of Old Machine (₹)	66,000					
Tax saving ₹ 4,00,000 x 34%		1,36,000				
Maintenance (₹)		-15000	-15000	-15000	-15000	-15000
Tax saving on above @ 34% (₹)		5,100	5,100	5,100	5,100	5,100
Terminal Cash Flow (₹)						1,00,000
Tax on above @ 34% (₹)						-34,000
Cash Flow (₹)	66,000	1,26,100	-9,900	-9,900	-9,900	56,100
PV Factor	1.000	0.893	0.797	0.712	0.636	0.567
PV of Cash Flows (₹)	66,000	1,12,607	-7,890	-7,049	-6,296	31,809

NPV = ₹ 1,89,161

The second alternative is recommended.

Question 24

Alfa Ltd. desires to acquire a diesel generating set costing ₹ 20 lakh which will be used for a period of 5 years. It is considering two alternatives (i) taking the generating set on lease or (ii) purchasing the asset outright by raising a loan. The company has been offered a lease contract with a lease payment of ₹ 5.2 lakh per annum for five years payable in advance. Company's banker requires the loan to be repaid @ 12% p.a. in 5 equal annual instalments, each installment being due at the beginning of the each year. Tax relevant depreciation of the generator is 20% as per WDV method. At the end of 5th year the generator can be sold at ₹ 2,00,000. Marginal Tax rate of Alfa Ltd. is 30% and its post tax cost of capital is 10%.

Determine:

(a) The Net Advantage of Leasing to Alfa Ltd. and recommend whether leasing is financially viable.

(b) Break Even Lease Rental.

Answer

Workings:

(1) Calculation of annual installment

₹ 20 lakh/ 4.038 = ₹ 4.95 lakh

3.038* + 1 = 4.038

* PVIAF @ 12% for 4 years

(2) Calculation of tax shield or tax benefit on interest on debt : -

Yr.	Installment (₹ lakh)	Opening value (₹ lakh)	Closing value (₹ lakh)	Principal payment (₹ lakh)	Interest 12% (₹ lakh)	Tax shield (₹ lakh)
0	4.95	20.00	15.05	4.95	-	-
1	4.95	15.05	11.90	3.14	1.80	0.54
2	4.95	11.91	8.38	3.52	1.43	0.43
3	4.95	8.39	4.45	3.94	1.00	0.30
4	4.95	4.45*	-	4.45	0.52	0.16

* Balancing Figure

(3) Calculation of tax shield or tax benefit on depreciation: -

Year	Opening value (₹ lakh)	Closing value (₹ lakh)	Depreciation (₹ lakh)	Tax Saving @ 30% (₹ lakh)
1	20	16	4.00	1.20
2	16	12.80	3.20	0.96
3	12.80	10.24	2.56	0.77
4	10.24	8.19	2.05	0.62
5	8.19	-	1.64	0.49

(4) Calculation of PV of Cash Outflow under borrowing and buying option

Year	Installment (₹ lakh)	Tax Shield on Interest (₹ lakh)	Tax Shield on Dep. (₹ lakh)	Net	PVF @ 8.4%	PV (₹ lakh)
0	4.95	-	-	4.95	1	4.95
1	4.95	0.54	1.20	3.21	0.922	2.96
2	4.95	0.43	0.96	3.56	0.851	3.03
3	4.95	0.30	0.77	3.88	0.785	3.05
4	4.95	0.16	0.62	4.17	0.724	3.02
5	-	-	0.49	(0.49)	0.668	(0.33)
5	-	-		(2.00)	0.668	(1.336)
						15.344

(5) Calculation of Present Value (PV) of lease decision : -

Particulars	Years	Amount (₹ lakh)	PVF @ 8.4%	PV (₹ lakh)
Lease Rent	0 -4	5.2	4.282	(-) 22.27
Tax relief on lease	1 -5	1.56	3.95	6.16
				(-) 16.11

(a) Calculation of Net Advantage of Leasing (NAL):

Particulars	(₹ lakh)
Present Value of buying decision	15.344
Less: Present Value of lease decision	- 16.110
Net Advantage of Leasing	- 0.766

Recommendation: Since Net Advantage of Leasing is negative the lease is financially not viable.

(b) Computation of Break Even Lease Rental (BELR)

Let L be the BELR then

Present Value of lease rentals	4.282 L
Present Value of Tax shield on Lease Payment	3.95 x 0.30 x L
	3.097 L

Accordingly, BELR will be

3.097 L = Rs. 15.344 Lakh

L = Rs. 4.954 Lakh i.e. Break Even Lease Rent

Note: Short Term Capital Loss on Salvage Value can also be considered.

Question 25

R Ltd., requires a machine for 5 years. There are two alternatives either to take it on lease or buy. The company is reluctant to invest initial amount for the project and approaches their bankers. Bankers are ready to finance 100% of its initial required amount at 15% rate of interest for any of the alternatives.

Under lease option, upfront Security deposit of ₹ 5,00,000/- is payable to lessor which is equal to cost of machine. Out of which, 40% shall be adjusted equally against annual lease rent. At the end of life of the machine, expected scrap value will be at book value after providing, depreciation @ 20% on written down value basis.

Under buying option, loan repayment is in equal annual installments of principal amount, which is equal to annual lease rent charges. However in case of bank finance for lease option, repayment of principal amount equal to lease rent is adjusted every year, and the balance at the end of 5th year.

Assume Income tax rate is 30%, interest is payable at the end of every year and discount rate is @ 15% p.a. The following discounting factors are given:

Year	*1*	*2*	*3*	*4*	*5*
Factor	*0.8696*	*0.7562*	*0.6576*	*0.5718*	*0.4972*

Which option would you suggest on the basis of net present values?

Answer

Cash outflow under borrow and buy option

Working Notes:

1. Calculation of Interest Amount

Year	Repayment of Principal (₹)	Principal Outstanding (₹)	Interest (₹)	Closing Balance (₹)
1	1,00,000	5,00,000	75,000	4,00,000
2	1,00,000	4,00,000	60,000	3,00,000
3	1,00,000	3,00,000	45,000	2,00,000
4	1,00,000	2,00,000	30,000	1,00,000
5	1,00,000	1,00,000	15,000	-

2. Depreciation Schedule

Year	Opening Balance (₹)	Depreciation (₹)	Closing Balance (₹)
1	5,00,000	1,00,000	4,00,000
2	4,00,000	80,000	3,20,000
3	3,20,000	64,000	2,56,000
4	2,56,000	51,200	2,04,800
5	2,04,800	40,960	1,63,840

3. Tax Benefit on Depreciation and Interest

Year	Interest (₹)	Depreciation (₹)	Total (₹)	Tax Benefit @ 30% (₹)
1	75,000	1,00,000	1,75,000	52,500
2	60,000	80,000	1,40,000	42,000

3	45,000	64,000	1,09,000	32,700
4	30,000	51,200	81,200	24,360
5	15,000	40,960	55,960	16,788

PV of Cash Outflow in Borrow and Buying Option

Year	Cash outflow (₹)	Tax Benefit (₹)	Net Cash Outflow (₹)	PVF@15%	PV (₹)
1	1,75,000	52,500	1,22,500	0.8696	1,06,526
2	1,60,000	42,000	1,18,000	0.7562	89,232
3	1,45,000	32,700	1,12,300	0.6576	73,848
4	1,30,000	24,360	1,05,640	0.5718	60,405
5	1,15,000	16,788	98,212	0.4972	48,831
5	(1,63,840)		(1,63,840)	0.4972	(81,461)
					2,97,381

Cash outflow under borrow and lease option

Cash payment to Lessor/Tax Benefits on Lease Payment (Annual Lease Rent = ₹ 1,00,000)

Year	Net Lease Rent (₹)	Security Deposit (₹)	Tax Benefit on Gross Lease Rent (₹)	Net Cash Outflow (₹)
1	60,000*		30,000	30,000
2	60,000		30,000	30,000
3	60,000		30,000	30,000
4	60,000		30,000	30,000
5	60,000	(3,00,000)	30,000	(2,70,000)

* ₹ 1,00,000 – ₹ 40,000 = ₹ 60,000

Cash payment to Bank/ Tax Benefits on Interest Payment

Year	Principal Payment (₹)	Interest (₹)	Total (₹)	Tax Benefit on Interest (₹)	Net Outflow (₹)
1	40,000	75,000	1,15,000	22,500	92,500
2	40,000	69,000	1,09,000	20,700	88,300

3	40,000	63,000	1,03,000	18,900	84,100
4	40,000	57,000	97,000	17,100	79,900
5	3,40,000	51,000	3,91,000	15,300	3,75,700

PV of Cash Outflow in Borrow and Leasing Option

Year	Cash outflow to Bank (₹)	Cash Outflow under Lease (₹)	Total (₹)	PVF@15%	PV (₹)
1	92,500	30,000	1,22,500	0.8696	1,06,526
2	88,300	30,000	1,18,300	0.7562	89,458
3	84,100	30,000	1,14,100	0.6576	75,032
4	79,900	30,000	1,09,900	0.5718	62,841
5	3,75,700	(2,70,000)	1,05,700	0.4972	52,554
					3,86,411

Since PV of cash outflow is least in case of borrow and buying option it should be opted for.